

P R O J E C T facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

OIL recovery
P R O G R A M

INCREASING OIL PRODUCTION IN PARADOX BASIN SMALL FIELDS — THE UTAH GEOLOGICAL SURVEY CLASS 2 PROJECT

PRIMARY PROJECT

PARTNER

Utah Geological Survey
Salt Lake City, UT

FOSSIL ENERGY

PROGRAM

Oil Field Recovery
Demonstrations

MAIN SITE

Five Paradox Basin Fields
San Juan Co., UT

TOTAL ESTIMATED

COST

\$5.1 million

COST SHARING

DOE - \$2.4 million
Non-DOE - \$2.7 million

DE-FC22-95BC14988

Project Description

More than 200 million barrels of oil are at risk of premature abandonment in shallow shelf carbonate reservoirs in Utah's Paradox Basin. Although major oil companies have recovered 150 million barrels of oil from one large Paradox field using secondary and tertiary oil recovery techniques, these technologies have not been initiated in the nearby smaller, independent-owned fields producing from the same formation.

As part of the Department of Energy's Oil Recovery Field Demonstration Program, the Utah Geological Survey and its partners, Harken Energy Corporation and the Utah Division of Energy, are demonstrating the effectiveness of these techniques in increasing production and reserves. Each of the more than 100 smaller fields in the basin typically contain 2 to 10 million barrels of original oil-in-place, but only 15 to 20 percent of that oil is recoverable during primary production. Five small fields that produce from the Ismay and Desert Creek members of the Paradox Formation have been chosen for this study. After detailed reservoir information is collected and analyzed, waterflooding and CO₂ flooding techniques will be evaluated for their potential to increase well productivity and ultimate recovery.

As of early 1996, the reservoir simulation has been completed, the first horizontal development well has been drilled, core and logs are being examined, and completion operations and reservoir testing are being conducted. Site selection for the second development well is proceeding. Two more wells will be drilled and the selected recovery techniques will be conducted. After monitoring and analyzing results of the demonstration, the application of the techniques to other similar fields in the Paradox Basin and throughout the U.S. will be assessed. Technology transfer activities of the project results will include workshops and seminars, publications and technical presentations, and the creation of digital databases that will be available to the public.

Program Goal

As a major goal to counter the trend of increasing well abandonment, the Department of Energy's Oil Program supports the application of available and developing technologies that can extend the economic life of operating oil fields. In this project, the Utah Geological Survey and its partners are demonstrating the use of improved reservoir analysis and management, horizontal drilling and carbon dioxide flooding to reduce operating costs and increase production in small, marginally producing Paradox Basin oil fields.

The Survey estimates that production can be increased by 0.5 to 3.5 million barrels per field, depending on the size and condition of the field. If successful, application of these technologies to any significant proportion of the 150 fields in the Basin could result in many millions of barrels of additional oil, and could effect similar production increases in other basins throughout the U.S.

Project Partners

UTAH GEOLOGICAL SURVEY
Salt Lake City, Utah

HARKEN ENERGY CORP.
Irving, TX

UTAH DIVISION OF ENERGY
Salt Lake City, Utah

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CONTACT POINTS

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Project Benefits

The Paradox Basin has over 150 small Pennsylvanian-age fields similar to those featured in the project. A single successful flood of one of these small fields could show that there is an additional proven reserve base of 200 million barrels of oil in the region.

Production from the Paradox Basin fields is characterized by very high initial flow rates followed by a steep rate of decline which approaches the economic limit within a few years. Many of the Paradox fields are already only marginally economic for the operators. Since many of the operators are small companies without access to the full range of technical expertise needed to deal with the reservoir complexities in these fields, and are not willing to take the risk associated with applying EOR methods, many fields will be abandoned in the next few years.

The Utah Geological Survey estimates that application of these geological and engineering technologies to the fields in this project could nearly double production, yielding an additional 0.5 to 3.5 million barrels per field. The successful demonstration of economically feasible recovery technologies in this project and concerted efforts to transfer the project results to area operators is expected to stimulate the applications of the technologies in other fields, increase productivity and thereby reduce the rate of well abandonment. Application in only 10% of the Basin's 150 fields could produce as much as 7 to 50 million additional barrels, depending on the size of the field.

An additional benefit of this project is that it promotes energy self-sufficiency and resource development on the Navajo Nation Indian Reservation. Four of the five fields being studied are on Navajo Nation land, so that the technologies developed in the project will directly benefit tribal land reservoirs. Harken Energy, project partner and owner of the fields, employs a Navajo staff in the Montezuma Creek Office. In conducting the field demonstration project, the resource management and development technical capability of tribal members will be increased.

Cost Profile (Dollars in Millions)

	Budget Period 1		Budget Period 2	
	02/09/95	06/08/96	02/08/97	02/08/00
Department of Energy *	\$0.8		\$1.6	
Private Sector Partners	\$0.8		\$1.9	

* Obligated Funding

Key Milestones

